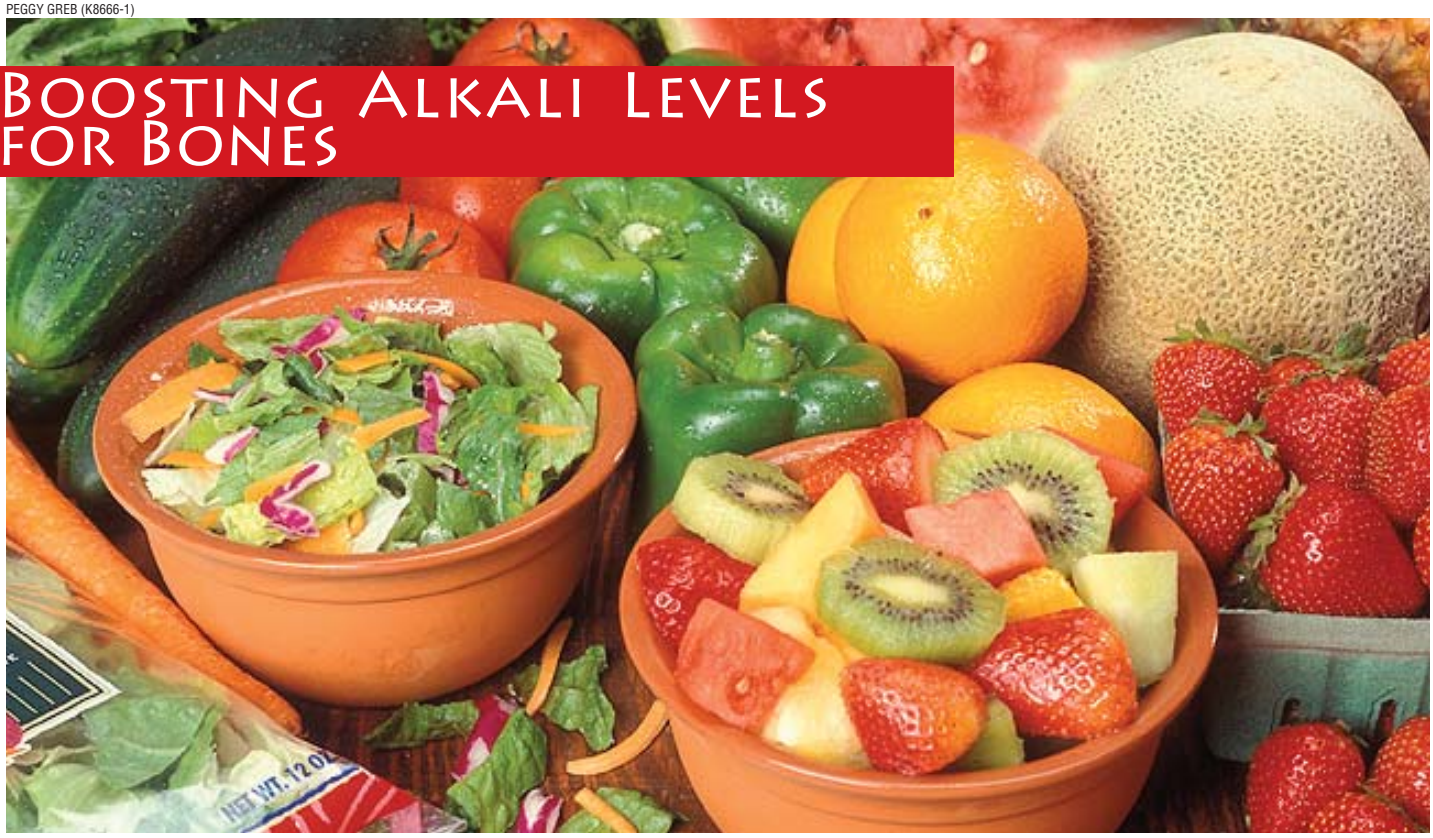
PEGGY GREB (K8666-1)

Boosting Alkali Levels for Bones



New research suggests that reducing the acid load that accompanies the typical high-protein diet may be important to maintaining bone health and muscle mass in older adults. Increased intake of fruits and vegetables would be one way to accomplish this.

ARS-funded scientists have recently reported that compounds in plant foods, which are alkali-producing, may help preserve bone and muscle mass. Now, a new ARS-funded study suggests that reducing the acid load that accompanies the typical high protein diet may be an important key.

The study was led by Lisa Ceglia and Bess Dawson-Hughes at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University, Boston, Massachusetts.

Diets high in protein and low in fruits and vegetables result in mild "acidosis" with aging because protein metabolism releases acids into the bloodstream in amounts that override the alkalinizing effect of bicarbonate in plant foods. Acidosis is a condition marked by reduced blood and body-tissue alkalinity.

The researchers studied a group of 19 healthy individuals, older than 50, on a controlled 41-day diet. To simulate consumption of the equivalent of eating about 14 servings of fruits and vegetables daily, 9 of the participants were randomly assigned to receive daily potassium bicarbonate that increased alkalinity via capsules. The other 10 participants were assigned to receive matching "placebo" capsules.

First, the volunteers underwent a 16-day phase-in period to gradually reach the maximal level of daily potassium bicarbonate or placebo capsules. Then, all 19 participants were given a 10-day low (or high) protein diet and were crossed over to a 10-day high (or low) protein diet, with a 5-day period in between. Compared to the recommended 58 grams of protein per day for a 160-pound adult (about the average weight of volunteers in the potassium group), the low-protein diet consisted of 36 grams of protein a day, and the high-protein diet consisted of 109 grams of protein a day.

Markers of muscle and bone metabolism were measured. That allowed the researchers to see whether boosting alkali levels with the capsules—to mimic high fruit and vegetable consumption—would strengthen muscle and bone health during the high- and low-protein diet interventions.

While on the study's high protein diet, the potassium bicarbonate, or alkalinized, group—when compared to the placebo group—had reduced urinary nitrogen excretion. The lower excretion level is an indicator of reduced muscle loss. The alkalinized group also had higher levels of IGF-1, a marker of both muscle and bone conservation, and of calcium absorption—a marker of bone conservation—on both protein diets compared to the placebo group.

The study suggests that the net effect of adequate dietary protein on muscle may be enhanced by reducing the accompanying acid load. Though not tested in the study, increasing intake of fruits and vegetables would be another way to increase the alkali potential of the diet, according to Dawson-Hughes.

The analysis was published in the *Journal of Clinical Endocrinology and Metabolism*.—By **Rosalie Marion Bliss,** ARS.

This research is part of Human Nutrition, an ARS national program (#107) described on the World Wide Web at www.nps.ars.usda.gov.

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